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3545 U.S. PTO

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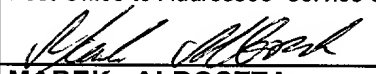
UTILITY PATENT APPLICATION TRANSMITTAL	Attorney Docket No. RYA-129/DIV Total Pages
	First Named Inventor STEPHEN J. BROWN
	Title NETWORKED SYSTEM FOR INTERACTIVE COMMUNICATION AND REMOTE MONITORING OF INDIVIDUALS

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APPLICATION ELEMENTS	ACCOMPANYING APPLICATION PARTS
1. <input checked="" type="checkbox"/> Fee Transmittal Form (two copies)	8. <input checked="" type="checkbox"/> Assignment cover sheet and document(s)
2. <input checked="" type="checkbox"/> Specification Total Pages: [33]	9. <input checked="" type="checkbox"/> Power of Attorney by Assignee [] with CFR 3.73(b) statement
3. <input checked="" type="checkbox"/> Drawing(s) Total Sheets: [15]	10. [] English Translation Document
4. <input checked="" type="checkbox"/> Oath or Declaration Total Pages: [1] a. <input checked="" type="checkbox"/> Newly executed (original or copy) b. [] Copy from a prior application 1.63(d) (complete Box 17 and note Box 5 below) i. [] Signed statement deleting inventors named in the prior application, see CFR 1.63(d)(2) and 1.33(b)	11. [] IDS/PTO-1449 [] with copies of cited references
5. [] Incorporation by Reference (if 4b is checked) The entire disclosure of the prior application, from which a copy of the oath or declaration is supplied under Box 4b, is considered as being part of the disclosure of the accompanying application and is hereby incorporated therein by reference.	12. [] Preliminary Amendment
6. [] Microfiche Computer Program (<i>Appendix</i>)	13. <input checked="" type="checkbox"/> Return Receipt Postcard (MPEP 503)
7. [] Nucleotide/Amino Acid Sequence Submission (all the following are necessary) a. [] Computer Readable Copy b. [] Paper Copy (identical to computer copy) c. [] Statement verifying identity of above copies	14. <input checked="" type="checkbox"/> Small Entity Statement [] Statement filed in prior application Status still proper and desired
17. If a CONTINUING APPLICATION, check appropriate box and supply the requisite information: [] continuation [X] divisional [] CIP ...of prior application No.: [08/946,341]	15. [] Certified Copy of Priority Document(s) (if foreign priority is claimed)
	16. [] Other:

18. CORRESPONDENCE ADDRESS					
NAME	MAREK ALBOSZTA LUMEN INTELLECTUAL PROPERTY SERVICES				
ADDRESS	426 LOWELL AVENUE				
CITY	PALO ALTO	STATE	CA	ZIP CODE	94301
COUNTRY	USA	TELEPHONE	(650) 321-6630	FAX	(650) 321-1621

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VERIFIED STATEMENT (DECLARATION) CLAIMING SMALL ENTITY STATUS (37 CFR 1.9(f) and 1.27(d)) – SMALL BUSINESS CONCERN

Application No.: not yet assigned
 Filing Date: filed herewith
 Applicant(s): Stephen J. Brown
 Title: **NETWORKED SYSTEM FOR INTERACTIVE COMMUNICATION AND REMOTE MONITORING OF INDIVIDUALS**

I hereby declare that I am the owner of, or an official empowered to act on behalf of, the entity identified below:

Name of Concern: **Health Hero Network, Inc.**
 Address of Concern: **2570 West El Camino Real, Suite 111
 Mountain View, CA 94040**

I hereby declare that the concern identified above qualifies as a small business concern as defined in 37 CFR 1.9(d), for purposes of paying reduced fees to the United States Patent and Trademark Office under section 41(a) and (b) of Title 35, United States Code, in that the number of employees of the concern, including those of its affiliates, does not exceed 500 persons. For purposes of this statement, (1) the number of employees of the business concern is the average over the previous fiscal year of the concern of the persons employed on a full-time, part-time or temporary basis during each of the pay periods of the fiscal year, and (2) concerns are affiliates of each other when either, directly or indirectly, one concern controls or has the power to control the other, or a third party or parties controls or has the power to control both.

I hereby declare that rights under contract or law have been conveyed to and remain with the small business concern identified above with regard to the invention identified above and described in the application for Letters Patent filed herewith.

If the rights held by the concern identified above are not exclusive, each individual, concern or organization having rights to the invention is listed below* and no rights to the invention are held by any person, other than the inventor, who would not qualify as an independent inventor under 37 CFR 1.9(c) if that person made the invention, or by any concern which would not qualify as a small business concern under 37 CFR 1.9(d) or a nonprofit organization under 37 CFR 1.9(e).

* NOTE: Separate verified statements are required from each named person, concern or organization having rights to the invention averring to their status as small entities. (37 CFR 1.27)


Name:	none	<input type="checkbox"/> Individual
Address:		<input type="checkbox"/> Small Business Concern
		<input type="checkbox"/> Nonprofit Organization

I acknowledge the duty to file, in this application for patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate (37 CFR 1.28(b)).

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

ASSIGNEE: **Health Hero Network, Inc.**
2570 West El Camino Real, Suite 111
Mountain View, CA 94040

Official Authorized to Act on Behalf of Assignee:

Signature: 
 Name: Stephen J. Brown
 Title: President

4/27/99
 Date

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Patent Application

of

Stephen J. Brown

for

**NETWORKED SYSTEM FOR INTERACTIVE COMMUNICATION
AND REMOTE MONITORING OF INDIVIDUALS**

RELATED APPLICATION INFORMATION

This application is a divisional application of application Ser. No. 08/946,341 filed October 7, 1997 which is a continuation-in-part of application Ser. No. 08/847,009 filed April 30, 1997. This application also claims priority from provisional application Ser. No. 60/041,746 filed March 28, 1997 and from provisional application Ser. No. 60/041,751 filed March 28, 1997. This application also claims priority from application Ser. No. 09/201,323 entitled "Leveraging Interactions with a Community of Individuals", filed November 30, 1998 and from application Ser. No. 09/274,433 entitled "Client-Initiated Leveraged Interaction with Providers", filed March 22, 1999. All of the above named applications are hereby incorporated by reference.

FIELD OF THE INVENTION

The present invention relates generally to communication systems for remote monitoring of individuals, and in particular to a networked system for remotely monitoring individuals and for communicating information to the individuals through the use script programs.

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BACKGROUND OF THE INVENTION

In the United States alone, over 100 million people have chronic health conditions, accounting for an estimated \$700 billion in annual medical costs. In an effort to control these medical costs, many healthcare providers have initiated outpatient or home healthcare programs for their patients. The potential benefits of these programs are particularly great for chronically ill patients who must treat their diseases on a daily basis. However, the success of these programs is dependent upon the ability of the healthcare providers to monitor the patients remotely to avert medical problems before they become complicated and costly. Unfortunately, no convenient and cost effective monitoring system exists for the patients who have the greatest need for monitoring, the poor and the elderly.

Prior attempts to monitor patients remotely have included the use of personal computers and modems to establish communication between patients and healthcare providers. However, computers are too expensive to give away and the patients who already own computers are only a small fraction of the total population. Further, the patients who own computers are typically young, well educated, and have good healthcare coverage. Thus, these patients do not have the greatest unmet medical needs. The patients who have the greatest unmet medical needs are the poor and elderly who do not own computers or who are unfamiliar with their use.

Similar attempts to establish communication between patients and healthcare providers have included the use of the Internet and internet terminals. Although internet terminals are somewhat less costly than personal computers, they are still too expensive to give away to patients. Moreover,

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5 monthly on-line access charges are prohibitive for poor patients.

Other attempts to monitor patients remotely have included the use of medical monitoring devices with built-in modems.

10 Examples of such monitoring devices include blood glucose meters, respiratory flow meters, and heart rate monitors. Unfortunately, these monitoring devices are only designed to collect physiological data from the patients. They do not allow flexible and dynamic querying of the patients for other
15 information, such as quality of life measures or psycho-social variables of illness.

Prior attempts to monitor patients remotely have also included the use of interactive telephone or video response
20 systems. Such interactive systems are disclosed in U.S. Patents 5,390,238 issued to Kirk et al. on February 14, 1995, 5,434,611 issued to Tamura on July 18, 1995, and 5,441,047 issued to David et al. on August 15, 1995. One disadvantage of these systems is that they either require a patient to
25 call in to a central facility to be monitored or require the central facility to call the patient according to a rigid monitoring schedule.

If the patients are required to call the central facility,
30 only the compliant patients will actually call regularly to be monitored. Non-compliant patients will typically wait until an emergency situation develops before contacting their healthcare provider, thus defeating the purpose of the monitoring system. If the central facility calls each
35 patient according to a monitoring schedule, it is intrusive to the patient's life and resistance to the monitoring grows over time.

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5 Another disadvantage of these conventional interactive
response systems is that they are prohibitively expensive for
poor patients. Further, it is difficult to identify each
patient uniquely using these systems. Moreover, these
10 systems are generally incapable of collecting medical data
from monitoring devices, such as blood glucose meters,
respiratory flow meters, or heart rate monitors.

OBJECTS AND ADVANTAGES OF THE INVENTION

15 In view of the above, it is an object of the present
invention to provide a simple and inexpensive system for
remotely monitoring patients and for communicating
information to the patients. It is another object of the
invention to provide a system which allows flexible and
20 dynamic querying of the patients. It is a further object of
the invention to provide a system which combines querying of
patients with medical device monitoring in the same
monitoring session. Another object of the invention is to
provide a monitoring system which incurs lower communications
25 charges than those incurred by conventional monitoring
systems. A further object of the invention is to provide a
monitoring system which may be used at any time convenient
for a patient.

30 These and other objects and advantages will become more
apparent after consideration of the ensuing description and
the accompanying drawings.

SUMMARY

35 The invention presents a networked system for remotely
monitoring an individual and for communicating information to
the individual. The system includes a server and a remote
interface for entering in the server a set of queries to be

5 answered by the individual. The server is preferably a world wide web server and the remote interface is preferably a personal computer or network terminal connected to the web server via the Internet. The system also includes a remotely programmable apparatus for interacting with the individual.

10 The apparatus is connected to the server via a communication network, preferably the Internet. The apparatus interacts with the individual in accordance with a script program received from the server.

15 The server includes a script generator for generating the script program from the queries entered through the remote interface. The script program is executable by the apparatus to communicate the queries to the individual, to receive responses to the queries, and to transmit the responses from the apparatus to the server. The server also includes a database connected to the script generator for storing the script program and the responses to the queries.

20 The apparatus has a communication device, such as a modem, for receiving the script program from the server and for transmitting the responses to the server. The apparatus also has a user interface for communicating the queries to the individual and for receiving the responses to the queries. In the preferred embodiment, the user interface includes a display for displaying the queries and user input buttons for entering the responses to the queries. In an alternative embodiment, the user interface includes a speech synthesizer for audibly communicating the queries and a speech recognizer for receiving spoken responses to the queries.

35 The apparatus also includes a memory for storing the script program and the responses to the queries. The apparatus further includes a microprocessor connected to the communication device, the user interface, and the memory.

- 5 The microprocessor executes the script program to communicate the queries to the individual, to receive the responses to the queries, and to transmit the responses to the server through the communication network.
- 10 In the preferred embodiment, the system also includes at least one monitoring device for producing measurements of a physiological condition of the individual and for transmitting the measurements to the apparatus. The apparatus further includes a device interface connected to
- 15 the microprocessor for receiving the measurements from the monitoring device. The measurements are stored in the memory and transmitted to the server with the responses to the queries. The server also preferably includes a report generator connected to the database for generating a report
- 20 of the measurements and responses. The report is displayed on the remote interface.

BRIEF DESCRIPTION OF THE DRAWINGS

- 25 FIG. 1 is a block diagram of a networked system according to a preferred embodiment of the invention.
- FIG. 2 is a block diagram illustrating the interaction of the components of the system of FIG. 1.
- FIG. 3 is a perspective view of a remotely programmable
- 30 apparatus of the system of FIG. 1.
- FIG. 4 is a block diagram illustrating the components of the apparatus of FIG. 3.
- FIG. 5 is a script entry screen according to the preferred embodiment of the invention.
- 35 FIG. 6A is a listing of a sample script program according to the preferred embodiment of the invention.
- FIG. 6B is a continuation of the listing of FIG. 6A.
- FIG. 7 is a script assignment screen according to the preferred embodiment of the invention.

- 5 FIG. 8 is a sample query appearing on a display of the apparatus of FIG. 3.
- FIG. 9 is a sample prompt appearing on the display of the apparatus of FIG. 3.
- 10 FIG. 10 is a sample report displayed on a workstation of the system of FIG. 1.
- FIG. 11A is a flow chart illustrating the steps included in a monitoring application executed by the server of FIG. 1 according to the preferred embodiment of the invention.
- 15 FIG. 11B is a continuation of the flow chart of FIG. 11A.
- FIG. 12A is a flow chart illustrating the steps included in the script program of FIGS. 6A - 6B.
- FIG. 12B is a continuation of the flow chart of FIG. 12A.
- 20 FIG. 13 is a perspective view of a remotely programmable apparatus according to a second embodiment of the invention.
- FIG. 14 is a sample prompt appearing on a display of the apparatus of FIG. 13.
- FIG. 15 is a block diagram illustrating the components of the apparatus of FIG. 13.
- 25 FIG. 16 is a schematic block diagram illustrating the interaction of the server of FIG. 1 with the apparatus of FIG. 3 according to a third embodiment of the invention.
- 30 FIG. 17 is a first sample message appearing on the display of the apparatus of FIG. 3.
- FIG. 18 is a second sample message appearing on the display of the apparatus of FIG. 3.
- 35 FIG. 19 is a script entry screen according to the third embodiment of the invention.

DETAILED DESCRIPTION

5 The invention presents a system and method for remotely
monitoring individuals and for communicating information to
the individuals. In a preferred embodiment of the invention,
the individuals are patients and the system is used to
collect data relating to the health status of the patients.
10 However, it is to be understood that the invention is not
limited to remote patient monitoring. The system and method
of the invention may be used for any type of remote
monitoring application. The invention may also be
implemented as an automated messaging system for
15 communicating information to individuals, as will be
discussed in an alternative embodiment below.

A preferred embodiment of the invention is illustrated in
FIGS. 1 - 12. Referring to FIG. 1, a networked system **16**
20 includes a server **18** and a workstation **20** connected to server
18 through a communication network **24**. Server **18** is
preferably a world wide web server and communication network
24 is preferably the Internet. It will be apparent to one
skilled in the art that server **18** may comprise a single
25 stand-alone computer or multiple computers distributed
throughout a network. Workstation **20** is preferably a
personal computer, remote terminal, or web TV unit connected
to server **18** via the Internet. Workstation **20** functions as a
remote interface for entering in server **18** messages and
30 queries to be communicated to the patients.

System **16** also includes first and second remotely
programmable apparatuses **26** and **32** for monitoring first and
second patients, respectively. Each apparatus is designed to
35 interact with a patient in accordance with script programs
received from server **18**. Each apparatus is in communication
with server **18** through communication network **24**, preferably
the Internet. Alternatively, each apparatus may be placed in
communication with server **18** via wireless communication

5 networks, cellular networks, telephone networks, or any other
network which allows each apparatus to exchange data with
server **18**. For clarity of illustration, only two apparatuses
are shown in FIG. 1. It is to be understood that system **16**
10 may include any number of apparatuses for monitoring any
number of patients.

In the preferred embodiment, each patient to be monitored is
also provided with a monitoring device **28**. Monitoring device
28 is designed to produce measurements of a physiological
15 condition of the patient, record the measurements, and
transmit the measurements to the patient's apparatus through
a standard connection cable **30**. Examples of suitable
monitoring devices include blood glucose meters, respiratory
flow meters, blood pressure cuffs, electronic weight scales,
20 and pulse rate monitors. Such monitoring devices are well
known in the art. The specific type of monitoring device
provided to each patient is dependent upon the patient's
disease. For example, diabetes patients are provided with a
blood glucose meters for measuring blood glucose
25 concentrations, asthma patients are provided with respiratory
flow meters for measuring peak flow rates, obesity patients
are provided with weight scales, etc.

FIG. 2 shows server **18**, workstation **20**, and apparatus **26** in
30 greater detail. Server **18** includes a database **38** for storing
script programs **40**. The script programs are executed by each
apparatus to communicate queries and messages to a patient,
receive responses **42** to the queries, collect monitoring
device measurements **44**, and transmit responses **42** and
35 measurements **44** to server **18**. Database **38** is designed to
store the responses **42** and measurements **44**. Database **38**
further includes a look-up table **46**. Table **46** contains a
list of the patients to be monitored, and for each patient, a
unique patient identification code and a respective pointer

5 to the script program assigned to the patient. Each remote apparatus is designed to execute assigned script programs which it receives from server **18**.

FIGS. 3 - 4 show the structure of each apparatus according to the preferred embodiment. For clarity, only apparatus **26** is shown since each apparatus of the preferred embodiment has substantially identical structure to apparatus **26**. Referring to FIG. 3, apparatus **26** includes a housing **62**. Housing **62** is sufficiently compact to enable apparatus **26** to be hand-
10 held and carried by a patient. Apparatus **26** also includes a display **64** for displaying queries and prompts to the patient. In the preferred embodiment, display **64** is a liquid crystal display (LCD).

20 Four user input buttons **70A**, **70B**, **70C**, and **70D** are located adjacent display **64**. The user input buttons are for entering in apparatus **26** responses to the queries and prompts. In the preferred embodiment, the user input buttons are momentary contact push buttons. In alternative embodiments, the user input buttons may be replaced by switches, keys, a touch sensitive display screen, or any other data input device.

25 Three monitoring device jacks **68A**, **68B**, and **68C** are located on a surface of housing **62**. The device jacks are for
30 connecting apparatus **26** to a number of monitoring devices, such as blood glucose meters, respiratory flow meters, or blood pressure cuffs, through respective connection cables (not shown). Apparatus **26** also includes a modem jack **66** for connecting apparatus **26** to a telephone jack through a
35 standard connection cord (not shown). Apparatus **26** further includes a visual indicator, such as a light emitting diode (LED) **74**. LED **74** is for visually notifying the patient that he or she has unanswered queries stored in apparatus **26**.

FIG. 4 is a schematic block diagram illustrating the components of apparatus **26** in greater detail. Apparatus **26** includes a microprocessor **76** and a memory **80** connected to microprocessor **76**. Memory **80** is preferably a non-volatile memory, such as a serial EEPROM. Memory **80** stores script programs received from the server, measurements received from monitoring device **28**, responses to queries, and the patient's unique identification code. Microprocessor **76** also includes built-in read only memory (ROM) which stores firmware for controlling the operation of apparatus **26**. The firmware includes a script interpreter used by microprocessor **76** to execute the script programs. The script interpreter interprets script commands which are executed by microprocessor **76**. Specific techniques for interpreting and executing script commands in this manner are well known in the art.

Microprocessor **76** is preferably connected to memory **80** using a standard two-wire I²C interface. Microprocessor **76** is also connected to user input buttons **70**, LED **74**, a clock **84**, and a display driver **82**. Clock **84** indicates the current date and time to microprocessor **76**. For clarity of illustration, clock **84** is shown as a separate component, but is preferably built into microprocessor **76**. Display driver **82** operates under the control of microprocessor **76** to display information on display **64**. Microprocessor **76** is preferably a PIC 16C65 processor which includes a universal asynchronous receiver transmitter (UART) **78**. UART **78** is for communicating with a modem **86** and a device interface **90**. A CMOS switch **88** under the control of microprocessor **76** alternately connects modem **86** and interface **90** to UART **78**.

Modem **86** is connected to a telephone jack **22** through modem jack **66**. Modem **86** is for exchanging data with server **18** through communication network **24**. The data includes script

5 programs which are received from the server as well as
responses to queries, device measurements, script
identification codes, and the patient's unique identification
code which modem **86** transmits to the server. Modem **86** is
preferably a complete 28.8 K modem commercially available
10 from Cermetek, although any suitable modem may be used.

Device interface **90** is connected to device jacks **68A**, **68B**,
and **68C**. Device interface **90** is for interfacing with a
number of monitoring devices, such as blood glucose meters,
15 respiratory flow meters, blood pressure cuffs, weight scales,
or pulse rate monitors, through the device jacks. Device
interface **90** operates under the control of microprocessor **76**
to collect measurements from the monitoring devices and to
output the measurements to microprocessor **76** for storage in
20 memory **80**. In the preferred embodiment, interface **90** is a
standard RS232 interface. For simplicity of illustration,
only one device interface is shown in FIG. 4. However, in
alternative embodiments, apparatus **26** may include multiple
device interfaces to accommodate monitoring devices which
25 have different connection standards.

Referring again to FIG. 2, server **18** includes a monitoring
application **48**. Monitoring application **48** is a controlling
software application executed by server **18** to perform the
30 various functions described below. Application **48** includes a
script generator **50**, a script assignor **52**, and a report
generator **54**. Script generator **50** is designed to generate
script programs **40** from script information entered through
workstation **20**. The script information is entered through a
35 script entry screen **56**. In the preferred embodiment, script
entry screen **56** is implemented as a web page on server **18**.
Workstation **20** includes a web browser for accessing the web
page to enter the script information.

FIG. 5 illustrates script entry screen **56** as it appears on workstation **20**. Screen **56** includes a script name field **92** for specifying the name of a script program to be generated. Screen **56** also includes entry fields **94** for entering a set of queries to be answered by a patient. Each entry field **94** has corresponding response choice fields **96** for entering response choices for the query. Screen **56** further includes check boxes **98** for selecting a desired monitoring device from which to collect measurements, such as a blood glucose meter, respiratory flow meter, or blood pressure cuff.

Screen **56** additionally includes a connection time field **100** for specifying a prescribed connection time at which each apparatus executing the script is to establish a subsequent communication link to the server. The connection time is preferably selected to be the time at which communication rates are the lowest, such as 3:00 AM. Screen **56** also includes a CREATE SCRIPT button **102** for instructing the script generator to generate a script program from the information entered in screen **56**. Screen **56** further includes a CANCEL button **104** for canceling the information entered in screen **56**.

In the preferred embodiment, each script program created by the script generator conforms to the standard file format used on UNIX systems. In the standard file format, each command is listed in the upper case and followed by a colon. Every line in the script program is terminated by a linefeed character {LF}, and only one command is placed on each line. The last character in the script program is a UNIX end of file character {EOF}. Table 1 shows an exemplary listing of script commands used in the preferred embodiment of the invention.

TABLE 1 - SCRIPT COMMANDS

Command	Description
CLS: {LF}	Clear the display.
ZAP: {LF}	Erase from memory the last set of query responses recorded.
LED: b{LF}	Turn the LED on or off, where b is a binary digit of 0 or 1. An argument of 1 turns on the LED, and an argument of 0 turns off the LED.
DISPLAY: {chars}{LF}	Display the text following the DISPLAY command.
INPUT: mmmm{LF}	Record a button press. The m's represent a button mask pattern for each of the four input buttons. Each m contains an "X" for disallowed buttons or an "O" for allowed buttons. For example, INPUT: OXOX{LF} allows the user to press either button #1 or #3.
WAIT: {LF}	Wait for any one button to be pressed, then continue executing the script program.
COLLECT: device{LF}	Collect measurements from the monitoring device specified in the COLLECT command. The user is preferably prompted to connect the specified monitoring device to the apparatus and press a button to continue.
NUMBER: aaaa{LF}	Assign a script identification code to the script program. The script identification code from the most recently executed NUMBER statement is subsequently transmitted to the server along with the query responses and device measurements. The script identification code identifies to the server which script program was most recently executed by the remote apparatus.
DELAY: t {LF}	Wait until time t specified in the DELAY command, usually the prescribed connection time.
CONNECT: {LF}	Perform a connection routine to establish a communication link to the server, transmit the patient identification code, query responses, device measurements, and script identification code to the server, and receive and store a new script program. When the server instructs the apparatus to disconnect, the script interpreter is restarted, allowing the new script program to execute.

5 The script commands illustrated in Table 1 are representative of the preferred embodiment and are not intended to limit the scope of the invention. After consideration of the ensuing description, it will be apparent to one skilled in the art many other suitable scripting languages and sets of script
10 commands may be used to implement the invention.

Script generator **50** preferably stores a script program template which it uses to create each script program. To generate a script program, script generator **50** inserts into
15 the template the script information entered in screen **56**. For example, FIGS. 6A - 6B illustrate a sample script program created by script generator **50** from the script information shown in FIG. 5.

20 The script program includes display commands to display the queries and response choices entered in fields **94** and **96**, respectively. The script program also includes input commands to receive responses to the queries. The script program further includes a collect command to collect device
25 measurements from the monitoring device specified in check boxes **98**. The script program also includes commands to establish a subsequent communication link to the server at the connection time specified in field **100**. The steps included in the script program are also shown in the flow
30 chart of FIGS. 12A - 12B and will be discussed in the operation section below.

Referring again to FIG. 2, script assignor **52** is for assigning script programs **40** to the patients. Script
35 programs **40** are assigned in accordance with script assignment information entered through workstation **20**. The script assignment information is entered through a script assignment screen **57**, which is preferably implemented as a web page on server **18**.

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FIG. 7 illustrates a sample script assignment screen **57** as it appears on workstation **20**. Screen **57** includes check boxes **106** for selecting a script program to be assigned and check boxes **108** for selecting the patients to whom the script program is to be assigned. Screen **57** also includes an ASSIGN SCRIPT button **112** for entering the assignments. When button **112** is pressed, the script assignor creates and stores for each patient selected in check boxes **108** a respective pointer to the script program selected in check boxes **106**. Each pointer is stored in the patient look-up table of the database. Screen **57** further includes an ADD SCRIPT button **110** for accessing the script entry screen and a DELETE SCRIPT button **114** for deleting a script program.

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Referring again to FIG. 2, report generator **54** is designed to generate a patient report **58** from the responses and device measurements received in server **18**. Patient report **58** is displayed on workstation **20**. FIG. 10 shows a sample patient report **58** produced by report generator **54** for a selected patient. Patient report **58** includes a graph **116** of the device measurements received from the patient, as well as a listing of responses **42** received from the patient. Specific techniques for writing a report generator program to display data in this manner are well known in the art.

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The operation of the preferred embodiment is illustrated in FIGS. 1 - 12. FIG. 11A is a flow chart illustrating steps included in the monitoring application executed by server **18**. FIG. 11B is a continuation of the flow chart of FIG. 11A. In step **202**, server **18** determines if new script information has been entered through script entry screen **56**. If new script information has not been entered, server **18** proceeds to step **206**. If new script information has been entered, server **18** proceeds to step **204**.

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As shown in FIG. 5, the script information includes a set of queries, and for each of the queries, corresponding responses choices. The script information also includes a selected monitoring device type from which to collect device

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measurements. The script information further includes a prescribed connection time for each apparatus to establish a subsequent communication link to the server. The script information is generally entered in server **18** by a healthcare provider, such as the patients' physician or case manager.

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Of course, any person desiring to communicate with the patients may also be granted access to server **18** to create and assign script programs. Further, it is to be understood that the system may include any number of remote interfaces for entering script generation and script assignment information in server **18**.

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In step **204**, script generator **50** generates a script program from the information entered in screen **56**. The script program is stored in database **38**. Steps **202** and **204** are preferably repeated to generate multiple script programs, e.g. a script program for diabetes patients, a script program for asthma patients, etc. Each script program corresponds to a respective one of the sets of queries entered through script entry screen **56**. Following step **204**, server **18**

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30

proceeds to step **206**.

In step **206**, server **18** determines if new script assignment information has been entered through assignment screen **57**. If new script assignment information has not been entered, server **18** proceeds to step **210**. If new script assignment information has been entered, server **18** proceeds to step **208**. As shown in FIG. 7, the script programs are assigned to each patient by selecting a script program through check boxes **106**, selecting the patients to whom the selected script

35

5 program is to be assigned through check boxes **108**, and
pressing the ASSIGN SCRIPT button **112**. When button **112** is
pressed, script assignor **52** creates for each patient selected
in check boxes **108** a respective pointer to the script program
selected in check boxes **106**. In step **208**, each pointer is
10 stored in look-up table **46** of database **38**. Following step
208, server **18** proceeds to step **210**.

In step **210**, server **18** determines if any of the apparatuses
are remotely connected to the server. Each patient to be
15 monitored is preferably provided with his or her own
apparatus which has the patient's unique identification code
stored therein. Each patient is thus uniquely associated
with a respective one of the apparatuses. If none of the
apparatuses is connected, server **18** proceeds to step **220**.

20 If an apparatus is connected, server **18** receives from the
apparatus the patient's unique identification code in step
212. In step **214**, server **18** receives from the apparatus the
query responses **42**, device measurements **44**, and script
25 identification code recorded during execution of a previously
assigned script program. The script identification code
identifies to the server which script program was executed by
the apparatus to record the query responses and device
measurements. The responses, device measurements, and script
30 identification code are stored in database **38**.

In step **216**, server **18** uses the patient identification code
to retrieve from table **46** the pointer to the script program
assigned to the patient. The server then retrieves the
35 assigned script program from database **38**. In step **218**,
server **18** transmits the assigned script program to the
patient's apparatus through communication network **24**.
Following step **218**, server **18** proceeds to step **220**.

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5 In step **220**, server **18** determines if a patient report request has been received from workstation **20**. If no report request has been received, server **18** returns to step **202**. If a report request has been received for a selected patient, server **18** retrieves from database **38** the measurements and query responses last received from the patient, step **222**. In 10 step **224**, server **18** generates and displays patient report **58** on workstation **20**. As shown in FIG. 10, report **58** includes the device measurements and query responses last received from the patient. Following step **224**, the server returns to 15 step **202**.

FIGS. 12A - 12B illustrate the steps included in the script program executed by apparatus **26**. Before the script program is received, apparatus **26** is initially programmed with the patient's unique identification code and the script 20 interpreter used by microprocessor **76** to execute the script program. The initial programming may be achieved during manufacture or during an initial connection to server **18**. Following initial programming, apparatus **26** receives from 25 server **18** the script program assigned to the patient associated with apparatus **26**. The script program is received by modem **86** through a first communication link and stored in memory **80**.

30 In step **302**, microprocessor **76** assigns a script identification code to the script program and stores the script identification code in memory **80**. The script identification code is subsequently transmitted to the server along with the query responses and device measurements to 35 identify to the server which script program was most recently executed by the apparatus. In step **304**, microprocessor **76** lights LED **74** to notify the patient that he or she has unanswered queries stored in apparatus **26**. LED **74** preferably remains lit until the queries are answered by the patient.

5 In step **306**, microprocessor **76** erases from memory **80** the last set of query responses recorded.

In step **308**, microprocessor **76** prompts the patient by displaying on display **64** "ANSWER QUERIES NOW? PRESS ANY
10 BUTTON TO START". In step **310**, microprocessor **76** waits until a reply to the prompt is received from the patient. When a reply is received, microprocessor **76** proceeds to step **312**. In step **312**, microprocessor **76** executes successive display and input commands to display the queries and response
15 choices on display **64** and to receive responses to the queries.

FIG. 8 illustrate a sample query and its corresponding response choices as they appear on display **64**. The response choices are positioned on display **64** such that each response choice is located proximate a respective one of the input buttons. In the preferred embodiment, each response choice is displayed immediately above a respective input button. The patient presses the button corresponding to his or her response. Microprocessor **76** stores each response in memory
20 **80**.

In steps **314** - **318**, microprocessor **76** executes commands to collect device measurements from a selected monitoring device. The script program specifies the selected monitoring device from which to collect the measurements. In step **314**, microprocessor **76** prompts the patient to connect the selected monitoring device, for example a blood glucose meter, to one of the device jacks. A sample prompt is shown in FIG. 9. In
30 step **316**, microprocessor **76** waits until a reply to the prompt is received from the patient. When a reply is received, microprocessor **76** proceeds to step **318**. Microprocessor **76** also connects UART **78** to interface **90** through switch **88**. In step **318**, microprocessor **76** collects the device measurements

5 from monitoring device **28** through interface **90**. The measurements are stored in memory **80**.

In step **320**, microprocessor **76** prompts the patient to connect apparatus **26** to telephone jack **22** so that apparatus **26** may
 10 connect to server **18** at the prescribed connection time. In step **322**, microprocessor **76** waits until a reply to the prompt is received from the patient. When a reply is received, microprocessor **76** turns off LED **74** in step **324**. In step **326**, microprocessor **76** waits until it is time to connect to
 15 server **18**. Microprocessor **76** compares the connection time specified in the script program to the current time output by clock **84**. When it is time to connect, microprocessor **76** connects UART **78** to modem **86** through switch **88**.

20 In step **328**, microprocessor **76** establishes a subsequent communication link between apparatus **26** and server **18** through modem **86** and communication network **24**. If the connection fails for any reason, microprocessor **76** repeats step **328** to get a successful connection. In step **330**, microprocessor **76**
 25 transmits the device measurements, query responses, script identification code, and patient identification code stored in memory **80** to server **18** through the subsequent communication link. In step **332**, microprocessor **76** receives through modem **86** a new script program from server **18**. The
 30 new script program is stored in memory **80** for subsequent execution by microprocessor **76**. Following step **332**, the script program ends.

One advantage of the monitoring system of the present
 35 invention is that it allows each patient to select a convenient time to respond to the queries, so that the monitoring system is not intrusive to the patient's schedule. A second advantage of the monitoring system is that it incurs very low communications charges because each remote apparatus

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5 connects to the server at times when communication rates are lowest. Moreover, the cost to manufacture each remote apparatus is very low compared to personal computers or internet terminals, so that the monitoring system is highly affordable.

10 A third advantage of the monitoring system is that it allows each apparatus to be programmed remotely through script programs. Patient surveys, connection times, display prompts, selected monitoring devices, patient customization,
15 and other operational details of each apparatus may be easily changed by transmitting a new script program to the apparatus. Moreover, each script program may be easily created and assigned by remotely accessing the server through the Internet. Thus, the invention provides a powerful,
20 convenient, and inexpensive system for remotely monitoring a large number of patients.

FIGS. 13 - 15 illustrate a second embodiment of the invention in which each remotely programmable apparatus has speech recognition and speech synthesis functionality. FIG. 13
25 shows a perspective view of an apparatus **27** according to the second embodiment. Apparatus **27** includes a speaker **72** for audibly communicating queries and prompts to the patient. Apparatus **27** also includes a microphone **118** for receiving
30 spoken responses to the queries and prompts. Apparatus **27** may optionally include a display **64** for displaying prompts to the patient, as shown in FIG. 14.

FIG. 15 is a schematic block diagram illustrating the
35 components of apparatus **27** in greater detail. Apparatus **27** is similar in design to the apparatus of the preferred embodiment except that apparatus **27** includes an audio processor chip **120** in place of microprocessor **76**. Audio processor chip **120** is preferably an RSC-164 chip commercially

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5 available from Sensory Circuits Inc. of 1735 N. First Street,
San Jose, California 95112.

Audio processor chip **120** has a microcontroller **122** for
executing script programs received from the server. A memory
10 **80** is connected to microcontroller **122**. Memory **80** stores
the script programs and a script interpreter used by
microcontroller **122** to execute the script programs. Memory
80 also stores measurements received from monitoring device
28, responses to the queries, script identification codes,
15 and the patient's unique identification code.

Audio processor chip **120** also has built in speech synthesis
functionality for synthesizing queries and prompts to a
patient through speaker **72**. For speech synthesis, chip **120**
20 includes a digital to analog converter (DAC) **142** and an
amplifier **144**. DAC **142** and amplifier **144** drive speaker **72**
under the control of microcontroller **122**.

Audio processor chip **120** further has built in speech
25 recognition functionality for recognizing responses spoken
into microphone **118**. Audio signals received through
microphone **118** are converted to electrical signals and sent
to a preamp and gain control circuit **128**. Preamp and gain
control circuit **128** is controlled by an automatic gain
30 control circuit **136**, which is in turn controlled by
microcontroller **122**. After being amplified by preamp **128**,
the electrical signals enter chip **120** and pass through a
multiplexer **130** and an analog to digital converter (ADC)
132. The resulting digital signals pass through a digital
35 logic circuit **134** and enter microcontroller **122** for speech
recognition.

Audio processor chip **120** also includes a RAM **138** for short
term memory storage and a ROM **140** which stores programs

5 executed by microcontroller **122** to perform speech recognition
and speech synthesis. Chip **120** operates at a clock speed
determined by a crystal **126**. Chip **120** also includes a clock
84 which provides the current date and time to
microcontroller **122**. As in the preferred embodiment,
10 apparatus **27** includes an LED **74**, display driver **82**, modem
86, and device interface **90**, all of which are connected to
microcontroller **122**.

The operation of the second embodiment is similar to the
15 operation of the preferred embodiment except that queries,
response choices, and prompts are audibly communicated to the
patient through speaker **72** rather than being displayed to the
patient on display **64**. The operation of the second
embodiments also differs from the operation of the preferred
20 embodiment in that responses to the queries and prompts are
received through microphone **118** rather than through user
input buttons.

The script programs of the second embodiment are similar to
25 the script program shown in FIGS. 6A - 6B, except that each
display command is replaced by a speech synthesis command and
each input command is replaced by a speech recognition
command. The speech synthesis commands are executed by
microcontroller **122** to synthesize the queries, response
30 choices, and prompts through speaker **72**. The speech
recognition commands are executed by microcontroller **122** to
recognize responses spoken into microphone **118**.

For example, to ask the patient how he or she feels and
35 record a response, microcontroller **122** first executes a
speech synthesis command to synthesize through speaker **72**
"How do you feel? Please answer with one of the following
responses: very bad, bad, good, or very good." Next,
microcontroller **118** executes a speech recognition command to

5 recognize the response spoken into microphone **118**. The
 recognized response is stored in memory **80** and subsequently
 transmitted to the server. Other than the differences
 described, the operation and advantages of the second
 10 embodiment are the same as the operation and advantages of
 the preferred embodiment described above.

Although the first and second embodiments focus on querying
 individuals and collecting responses to the queries, the
 system of the invention is not limited to querying
 15 applications. The system may also be used simply to
 communicate messages to the individuals. FIGS. 16 - 19
 illustrate a third embodiment in which the system is used to
 perform this automated messaging function. In the third
 embodiment, each script program contains a set of statements
 20 to be communicated to an individual rather than a set of
 queries to be answered by the individual. Of course, it will
 be apparent to one skilled in the art that the script
 programs may optionally include both queries and statements.

25 The third embodiment also shows how the queries and
 statements may be customized to each individual by merging
 personal data with the script programs, much like a standard
 mail merge application. Referring to FIG. 16, personal data
 relating to each individual is preferably stored in look-up
 30 table **46** of database **38**. By way of example, the data may
 include each individual's name, the name of each individual's
 physician, test results, appointment dates, or any other
 desired data. As in the preferred embodiment, database **38**
 also stores generic script programs **40** created by script
 35 generator **50**.

Server **18** includes a data merge program **55** for merging the
 data stored in table **46** with generic script programs **40**.
 Data merge program **55** is designed to retrieve selected data

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5 from table **46** and to insert the data into statements in
generic script programs **40**, thus creating custom script
programs **41**. Each custom script program **41** contains
statements which are customized to an individual. For
example, the statements may be customized with the
10 individual's name, test results, etc. Examples of such
customized statements are shown in FIGS. 17 - 18.

The operation of the third embodiment is similar to the
operation of the preferred embodiment except that the script
15 programs are used to communicate messages to the individuals
rather than to query the individuals. Each message is
preferably a set of statements. Referring to FIG. 19, the
statements may be entered in the server through script entry
screen **56**, just like the queries of the preferred embodiment.

20 Each statement preferably includes one or more insert
commands specifying data from table **46** to be inserted into
the statement. The insert commands instruct data merge
program **55** to retrieve the specified data from database **38**
25 and to insert the data into the statement. For example, the
insert commands shown in FIG. 19 instruct the data merge
program to insert a physician name, an appointment date, a
patient name, and a test result into the statements. As in
the preferred embodiment, each statement may also include one
30 or more response choices which are entered in fields **96**.

Following entry of the statements and response choices,
CREATE SCRIPT button **102** is pressed. When button **102** is
pressed, script generator **50** generates a generic script
35 program from the information entered in screen **56**. The
generic script program is similar to the script program shown
in FIGS. 6A - 6B, except that the display commands specify
statements to be displayed rather than queries. Further, the
statements include insert commands specifying data to be

5 inserted into the script program. As in the preferred embodiment, multiple script programs are preferably generated, e.g. a generic script program for diabetes patients, a generic script program for asthma patients, etc. The generic script programs are stored in database **38**.

10 Following generation of the generic script programs, server **18** receives script assignment information entered through script assignment screen **57**. As shown in FIG. 7, the script programs are assigned by first selecting one of the generic
15 script programs through check boxes **106**, selecting individuals through check boxes **108**, and pressing the ASSIGN SCRIPT button **112**. When button **112** is pressed, data merge program **55** creates a custom script program for each individual selected in check boxes **108**.

20 Each custom script program is preferably created by using the selected generic script program as a template. For each individual selected, data merge program **55** retrieves from database **38** the data specified in the insert commands. Next,
25 data merge program **55** inserts the data into the appropriate statements in the generic script program to create a custom script program for the individual. Each custom script program is stored in database **38**.

30 As each custom script program is generated for an individual, script assignor **52** assigns the script program to the individual. This is preferably accomplished by creating a pointer to the custom script program and storing the pointer with the individual's unique identification code in table **46**.

35 When the individual's remote apparatus connects to server **18**, server **18** receives from the apparatus the individual's unique identification code. Server **18** uses the unique identification code to retrieve from table **46** the pointer to the custom script program assigned to the individual. Next,

5 server **18** retrieves the assigned script program from database **38** and transmits the script program to the individual's apparatus through communication network **24**.

10 The apparatus receives and executes the script program. The execution of the script program is similar to the execution described in the preferred embodiment, except that statements are displayed to the individual rather than queries. FIGS. 17 - 18 illustrate two sample statements as they appear on display **64**. Each statement includes a response choice, 15 preferably an acknowledgment such as "OK". After reading a statement, the individual presses the button corresponding to the response choice to proceed to the next statement. Alternatively, the script program may specify a period of time that each statement is to be displayed before proceeding 20 to the next statement. The remaining operation of the third embodiment is analogous to the operation of the preferred embodiment described above.

25 Although it is presently preferred to generate a custom script program for each individual as soon as script assignment information is received for the individual, it is also possible to wait until the individual's apparatus connects to the server before generating the custom script program. This is accomplished by creating and storing a 30 pointer to the generic script program assigned to the individual, as previously described in the preferred embodiment. When the individual's apparatus connects to the server, data merge program **55** creates a custom script program for the individual from the generic script program assigned 35 to the individual. The custom script program is then sent to the individual's apparatus for execution.

SUMMARY, RAMIFICATIONS, AND SCOPE

5 Although the above description contains many specificities,
these should not be construed as limitations on the scope of
the invention but merely as illustrations of some of the
presently preferred embodiments. Many other embodiments of
the invention are possible. For example, the scripting
10 language and script commands shown are representative of the
preferred embodiment. It will be apparent to one skilled in
the art many other scripting languages and specific script
commands may be used to implement the invention.

15 Moreover, the invention is not limited to the specific
applications described. The system and method of the
invention have many other application both inside and outside
the healthcare industry. For example, pharmaceutical
manufacturers may apply the system in the clinical
20 development and post marketing surveillance of new drugs,
using the system as an interactive, on-line monitoring tool
for collecting data on the efficacy, side effects, and
quality of life impact of the drugs. Compared to the current
use of labor intensive patient interviews, the system
25 provides a fast, flexible, and cost effective alternative for
monitoring the use and effects of the drugs.

The system may also be used by home healthcare companies to
enhance the service levels provided to customers, e.g. panic
30 systems, sleep surveillance, specific monitoring of disease
conditions, etc. Alternatively, the system may be used to
monitor and optimize the inventory of home stationed health
supplies. As an example, the system may be connected to an
appropriate measuring device to optimize timing of oxygen
35 tank delivery to patients with COPD.

The system and method of the invention also have many
applications outside the healthcare industry. For example,
the system may be used for remote education over the

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5 Internet, facilitating educational communication with
children or adult trainees who lack access to sophisticated
and expensive computer equipment. The system may also be
used by law enforcement officers to perform on-line
surveillance of individuals on probation or parole.

10

Further, the invention has numerous applications for
gathering data from remotely located devices. For example,
the system may be used to collect data from smart appliances,
such as identification check systems. Alternatively, the
15 system may be applied to the remote monitoring of facilities,
including safety and security monitoring, or to environmental
monitoring, including pollution control and pipeline
monitoring. Many other suitable applications of the
invention will be apparent to one skilled in the art.

20

Therefore, the scope of the invention should be determined
not by the examples given, but by the appended claims and
their legal equivalents.

5

CLAIMS

What is claimed is:

- 1 1. A system for communicating information to an individual,
2 comprising:
3 a) remote interface configured for specifying information
4 to be communicated to the individual;
5 b) a server connected to said remote interface, said
6 server including script program generating configured
7 for generating a script program, said script program
8 for communicating the information to be communicated
9 to the individual; and
10 c) a remotely programmable apparatus networked to said
11 server via a communication network, said remotely
12 programmable apparatus including:
13 i) communication device for receiving said script
14 program from said server;
15 ii) memory device for storing said script program;
16 iii) user interface configured for conveying the
17 information to be communicated to the individual,
18 and for receiving input from the individual; and
19 iv) processor device for executing said script
20 program, said processor device connected to said
21 communication device, to said user interface, and
22 to said memory device.

- 1 2. The system of claim 1, wherein said communications device
2 comprises a modem.

- 1 3. The system of claim 1, further comprising at least one
2 monitoring device in communication with said remotely
3 programmable apparatus, said at least one monitoring
4 device for providing at least one measurement of a
5 physiological parameter of the individual.

4. The system of claim 3, wherein said measurement is transmitted to said remote interface device via said server.
5. The system of claim 3, wherein said at least one monitoring device is connected to said remotely programmable apparatus via a cable.
6. The system of claim 3, wherein said at least one monitoring device is selected from the group consisting of a blood glucose meter, a respiratory flow meter, a blood pressure cuff, an electronic weight scale, and a pulse rate monitor.
7. The system of claim 1, wherein the information to be communicated is customized to the individual.
8. The system of claim 1, wherein the information to be communicated is a message.
9. The system of claim 1, wherein the information to be communicated is a set of queries to be answered by the individual.
10. The system of claim 1, wherein said remotely programmable apparatus comprises at least one monitoring device jack for operably linking at least one monitoring device to said remotely programmable apparatus.
11. The system of claim 1, wherein said remotely programmable apparatus is located at the residence of an individual to be monitored, and said remote interface is located at a location remote from the residence of the individual to be monitored.

ABSTRACT OF THE DISCLOSURE

The invention presents a networked system for communicating information to an individual and for remotely monitoring the individual. The system includes a server and a remote interface for entering in the server a set of queries to be answered by the individual. The server is preferably a web server and the remote interface is preferably a personal computer or remote terminal connected to the server via the Internet. The system also includes a remotely programmable apparatus connected to the server via a communication network, preferably the Internet. The apparatus interacts with the individual in accordance with a script program received from the server. The server includes a script generator for generating the script program from the set of queries entered through the remote interface. The script program is received and executed by the apparatus to communicate the queries to the individual, to receive responses to the queries, and to transmit the responses from the apparatus to the server.

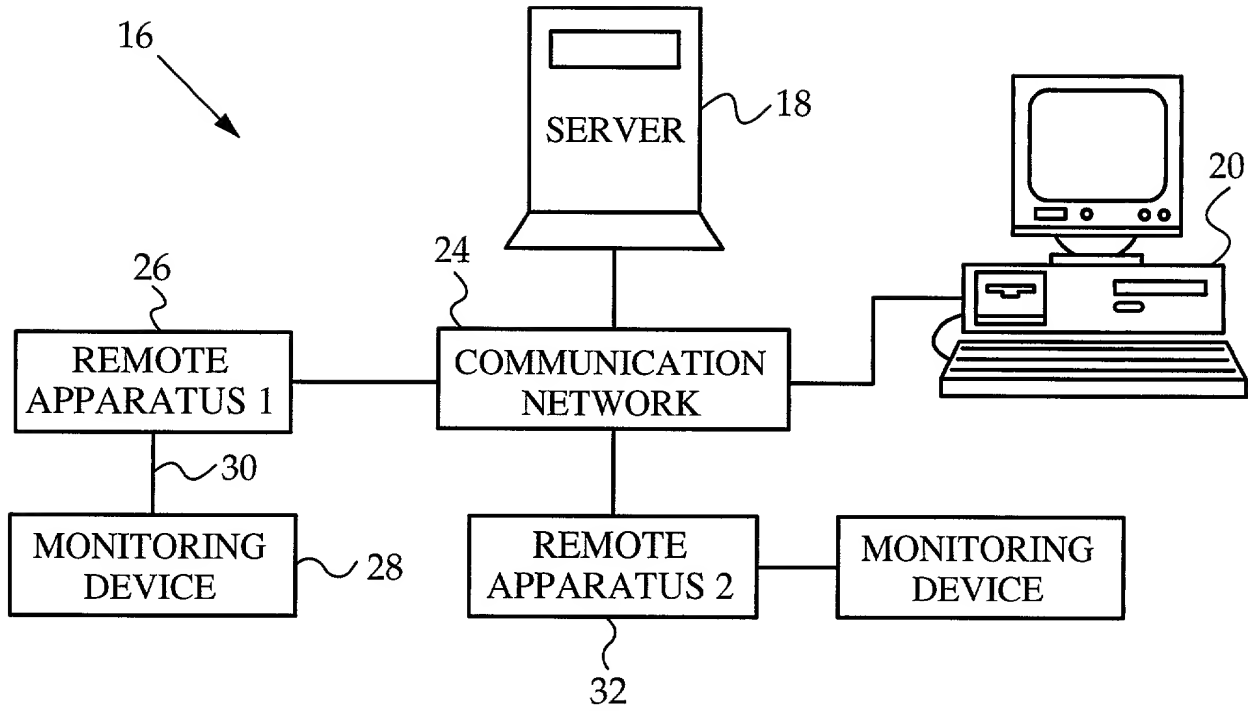


FIG. 1

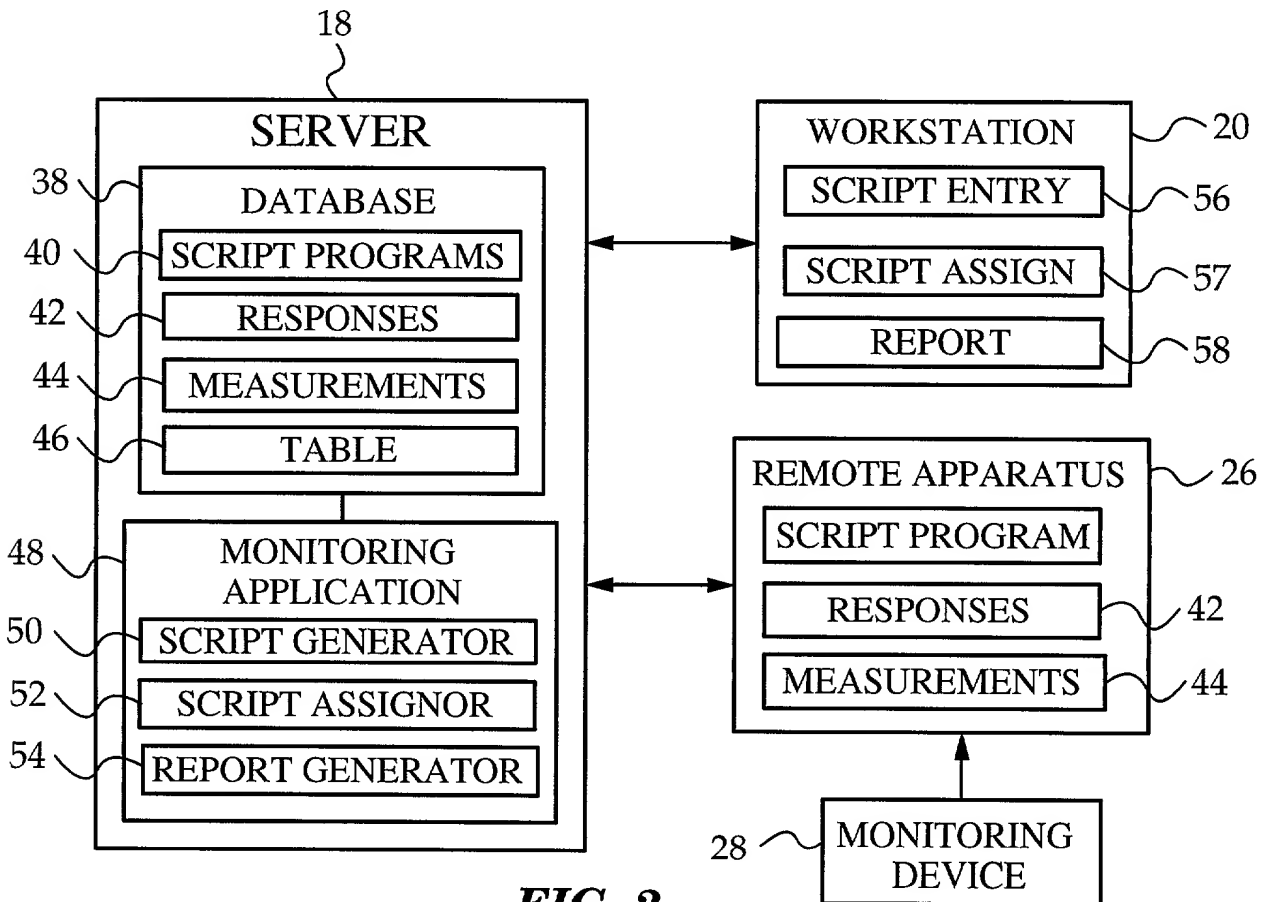


FIG. 2

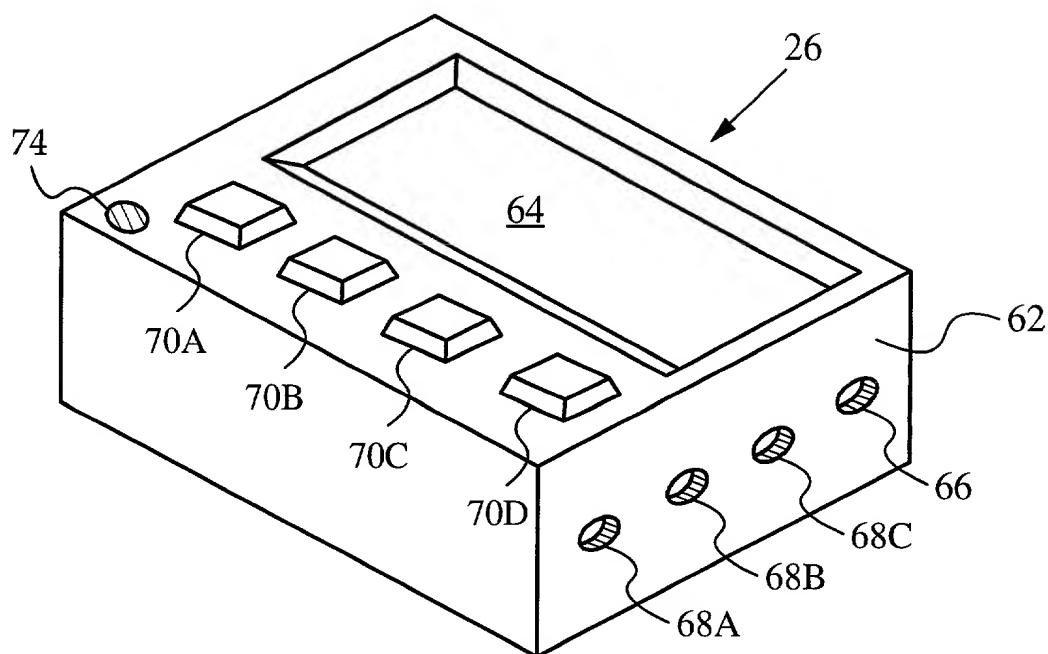


FIG. 3

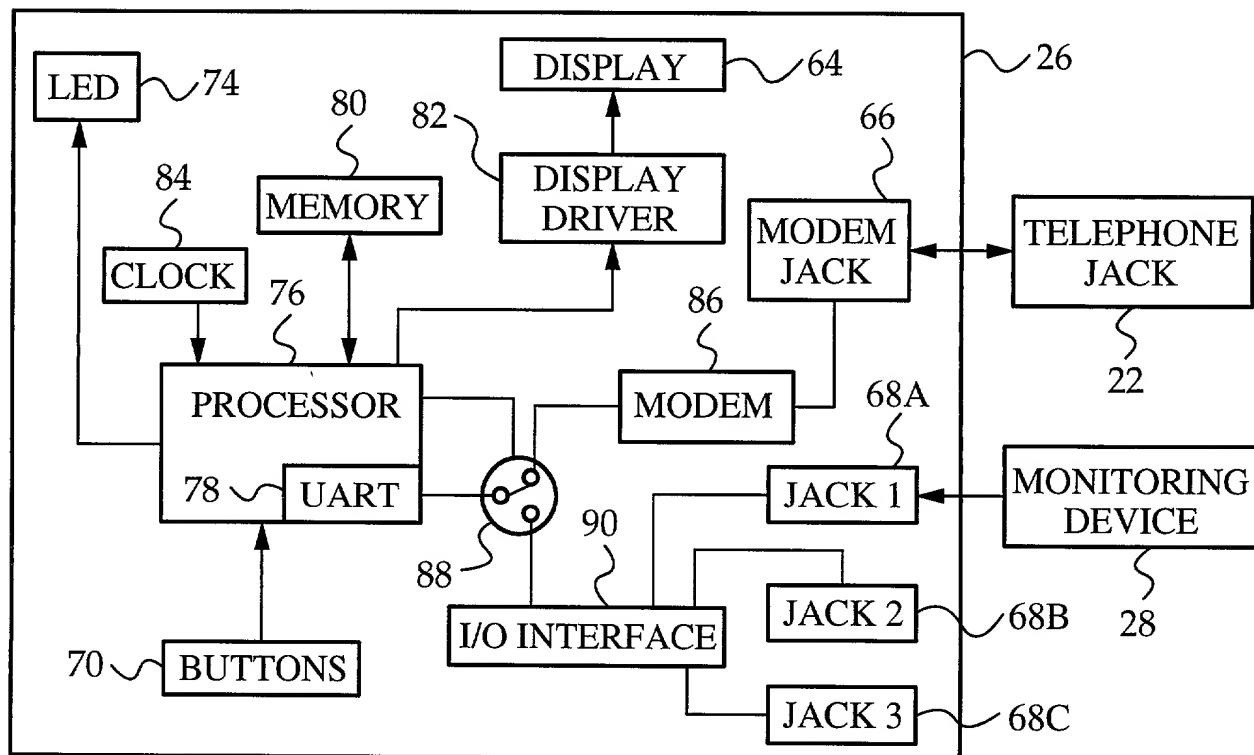


FIG. 4

56

SCRIPT ENTRY SCREEN

SCRIPT NAME:

DIABETES SCRIPT 1

92

QUERIES

	CHOICE 1	CHOICE 2	CHOICE 3	CHOICE 4
HOW DO YOU FEEL?	VERY BAD	BAD	GOOD	VERY GOOD
HOW WELL ARE YOU MANAGING YOUR DISEASE?	VERY BADLY	BADLY	WELL	VERY WELL
HOW HARD IS IT FOR YOU TO FOLLOW YOUR TREATMENT PLAN?	VERY HARD	HARD	EASY	VERY EASY
HOW HARD IS IT FOR YOU TO CONTROL YOUR BLOOD SUGAR?	VERY HARD	HARD	EASY	VERY EASY

94

96

SELECT DEVICE TYPE(S)

98

☒ GLUCOSE METER

☐ RESPIRATORY FLOW METER

☐ BP CUFF

CONNECTION TIME:

03:00

▽

100

102

CREATE SCRIPT

104

CANCEL

FIG. 5

4/15

NUMBER: 9001 {LF}

LED: 1 {LF}

ZAP: {LF}

CLS: {LF}

DISPLAY: ANSWER QUERIES NOW?
PRESS ANY BUTTON TO START {LF}

WAIT: {LF}

CLS: {LF}

DISPLAY: HOW DO YOU FEEL?

VERY VERY
BAD BAD GOOD GOOD {LF}

INPUT: OOOO {LF}

CLS: {LF}

DISPLAY: HOW WELL ARE YOU
MANAGING YOUR DISEASE?
VERY VERY
WELL BADLY WELL WELL {LF}

INPUT: OOOO {LF}

CLS: {LF}

DISPLAY: HOW HARD IS IT FOR YOU TO
FOLLOW YOUR TREATMENT PLAN?
VERY VERY
HARD HARD EASY EASY {LF}

INPUT: OOOO {LF}

CLS: {LF}

DISPLAY: HOW HARD IS IT FOR YOU TO
CONTROL YOUR BLOOD SUGAR?
VERY VERY
HARD HARD EASY EASY {LF}

FIG. 6A

663240-950066

INPUT: OOOO {LF}
CLS: {LF}
DISPLAY: CONNECT GLUCOSE METER
AND PRESS ANY BUTTON
WHEN FINISHED {LF}
WAIT: {LF}
CLS: {LF}
DISPLAY: COLLECTING MEASUREMENTS {LF}
COLLECT: GLUCOSE_METER {LF}
CLS: {LF}
DISPLAY: CONNECT APPARATUS TO
TELEPHONE JACK AND
PRESS ANY BUTTON
WHEN FINISHED {LF}
WAIT: {LF}
LED: 0 {LF}
CLS: {LF}
DELAY: 03:00 {LF}
DISPLAY: CONNECTING TO SERVER {LF}
CONNECT: {LF}
{EOF}

FIG. 6B

SCRIPT ASSIGNMENT SCREEN

<p>AVAILABLE SCRIPTS:</p> <div style="display: flex; flex-direction: column; gap: 10px;"> <div> <input checked="" type="checkbox"/> <u>DIABETES SCRIPT 1</u> </div> <div> <input type="checkbox"/> <u>DIABETES SCRIPT 2</u> </div> <div> <input type="checkbox"/> <u>ASTHMA SCRIPT 1</u> </div> </div>	<p>PATIENTS:</p> <div style="display: flex; flex-direction: column; gap: 10px;"> <div> <input checked="" type="checkbox"/> <u>DAN LINDSEY</u> </div> <div> <input type="checkbox"/> <u>MARK SMITH</u> </div> <div> <input type="checkbox"/> <u>DEAN JONES</u> </div> </div>
---	--

ADD SCRIPT

ASSIGN SCRIPT

DELETE SCRIPT

FIG. 7

HOW DO YOU FEEL?

VERY BAD	BAD	GOOD	VERY GOOD
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
70A	70B	70C	70D

FIG. 8

**CONNECT GLUCOSE METER
AND PRESS ANY BUTTON
WHEN FINISHED**

<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
70A	70B	70C	70D

FIG. 9

PATIENT REPORT

PATIENT:

DATE OF MEASUREMENT:

42

116

QUERY RESPONSES

HOW DO YOU FEEL?

HOW WELL ARE YOU
MANAGING YOUR DISEASE?

HOW HARD IS IT FOR YOU TO
FOLLOW YOUR TREATMENT PLAN?

HOW HARD IS IT FOR YOU TO
CONTROL YOUR BLOOD SUGAR?

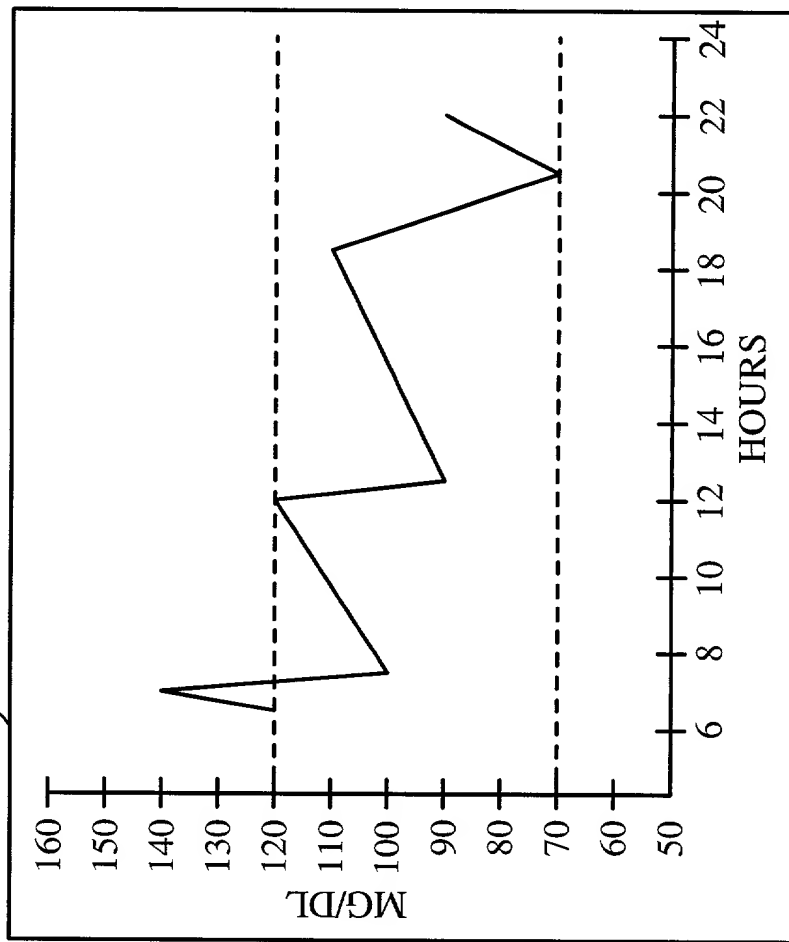


FIG. 10

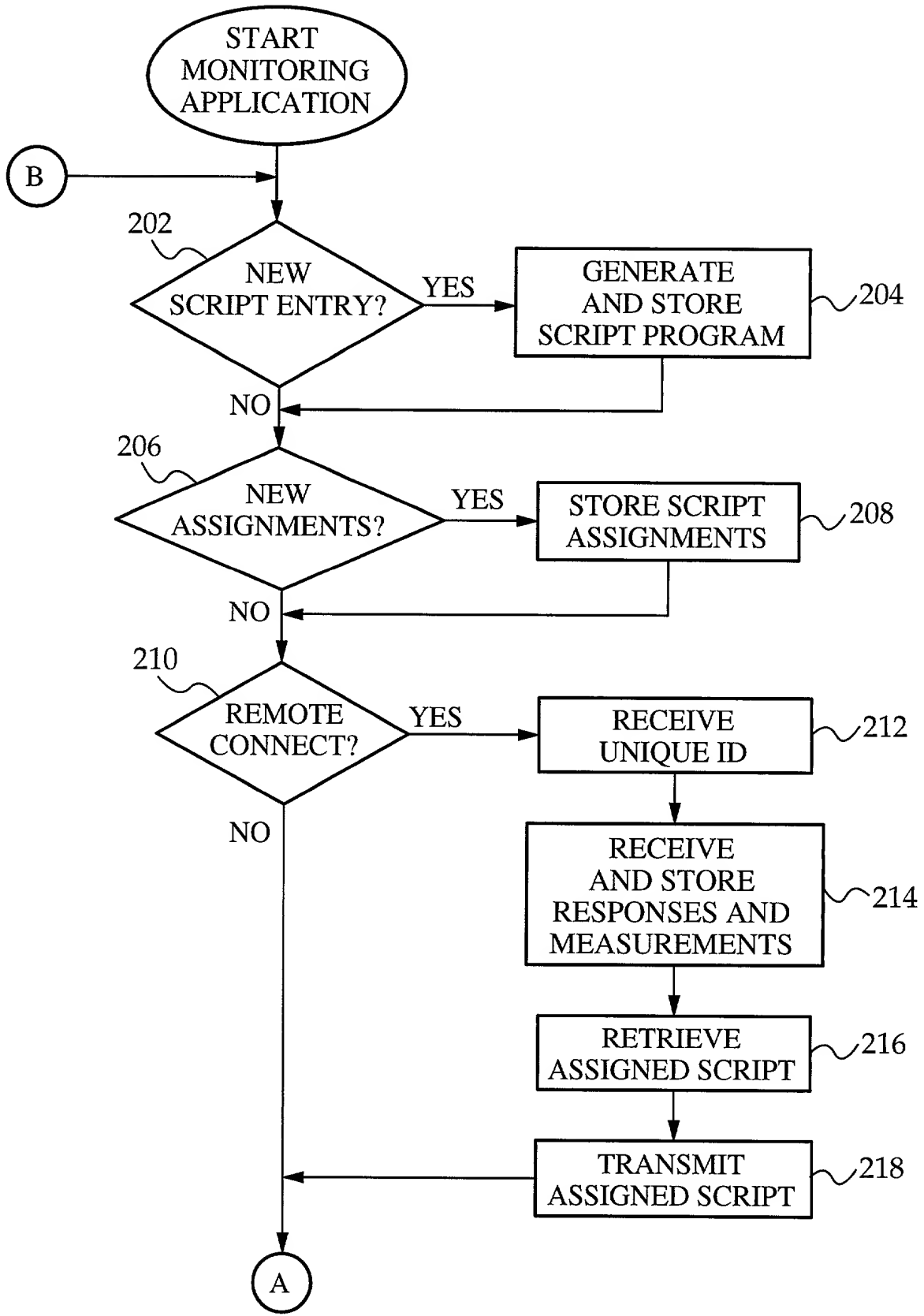


FIG. 11A

663240" 95800553

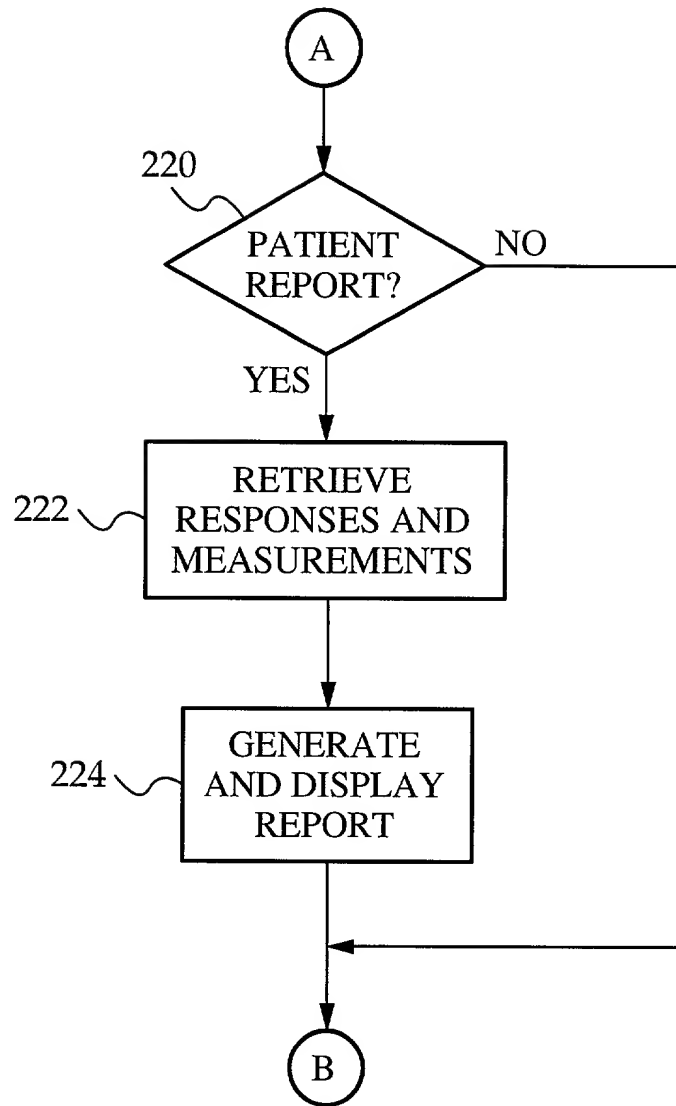


FIG. 11B

10/15

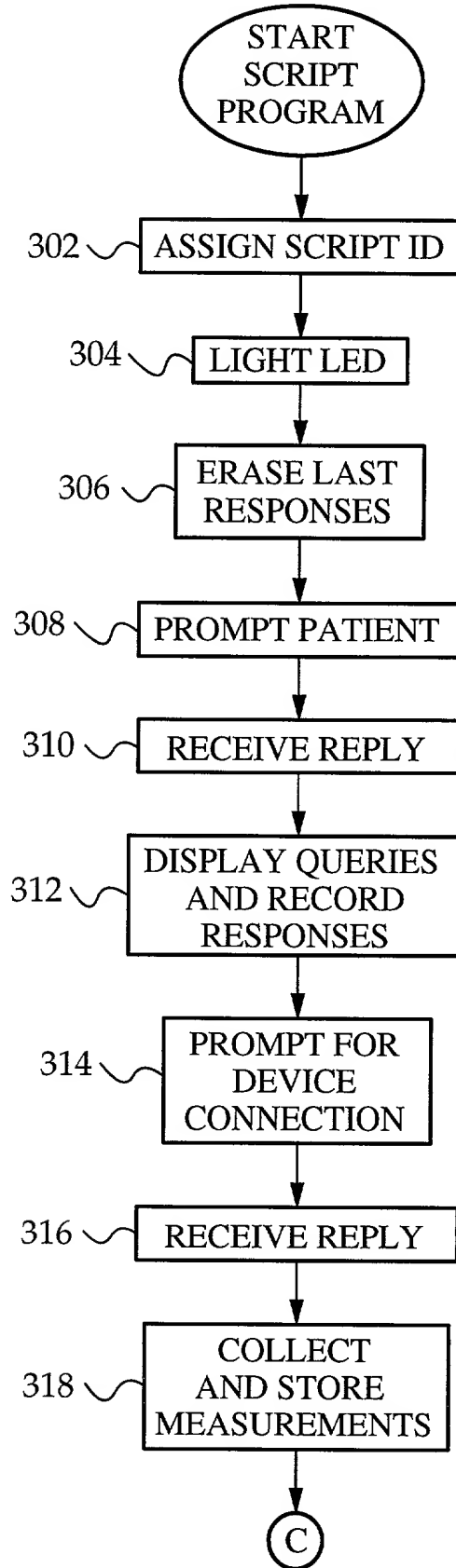


FIG. 12A

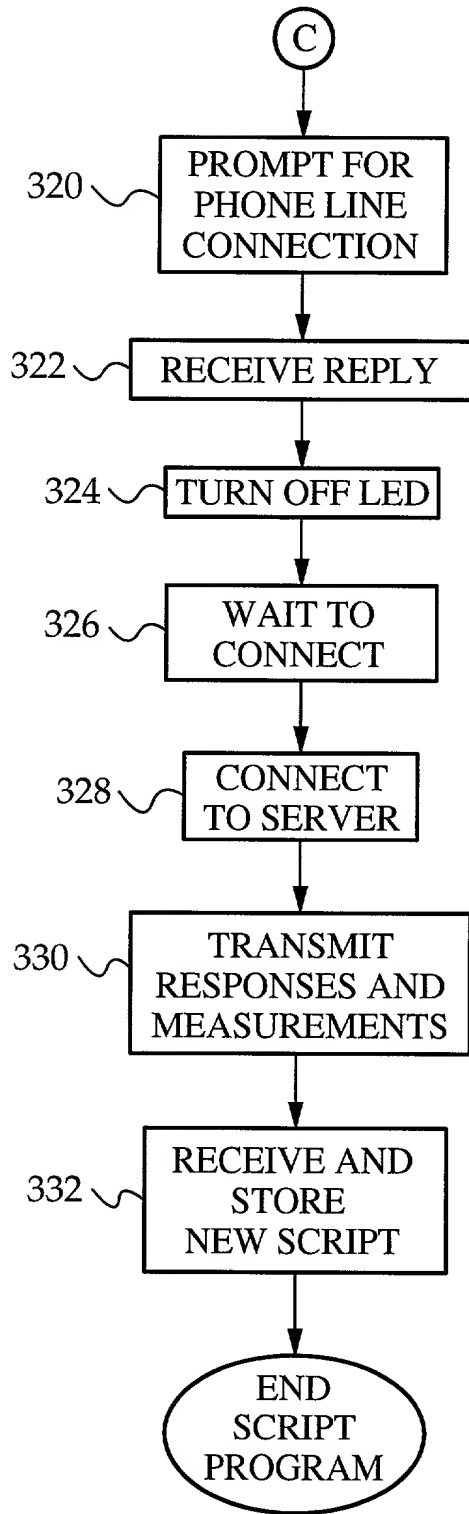


FIG. 12B

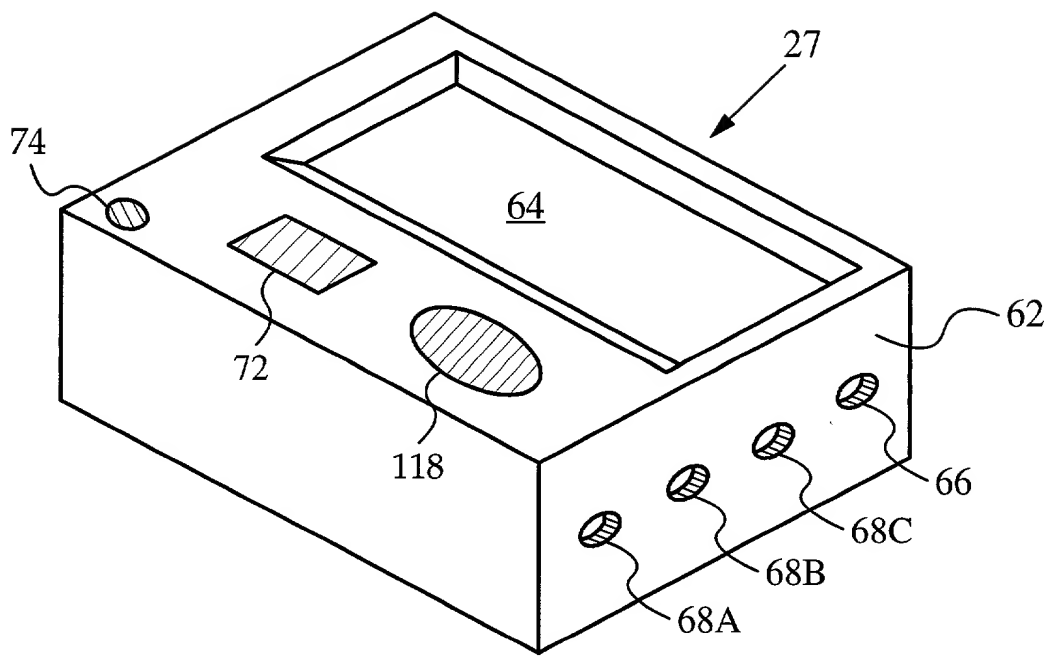


FIG. 13

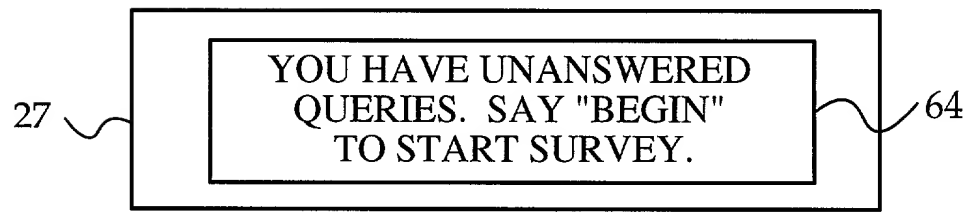
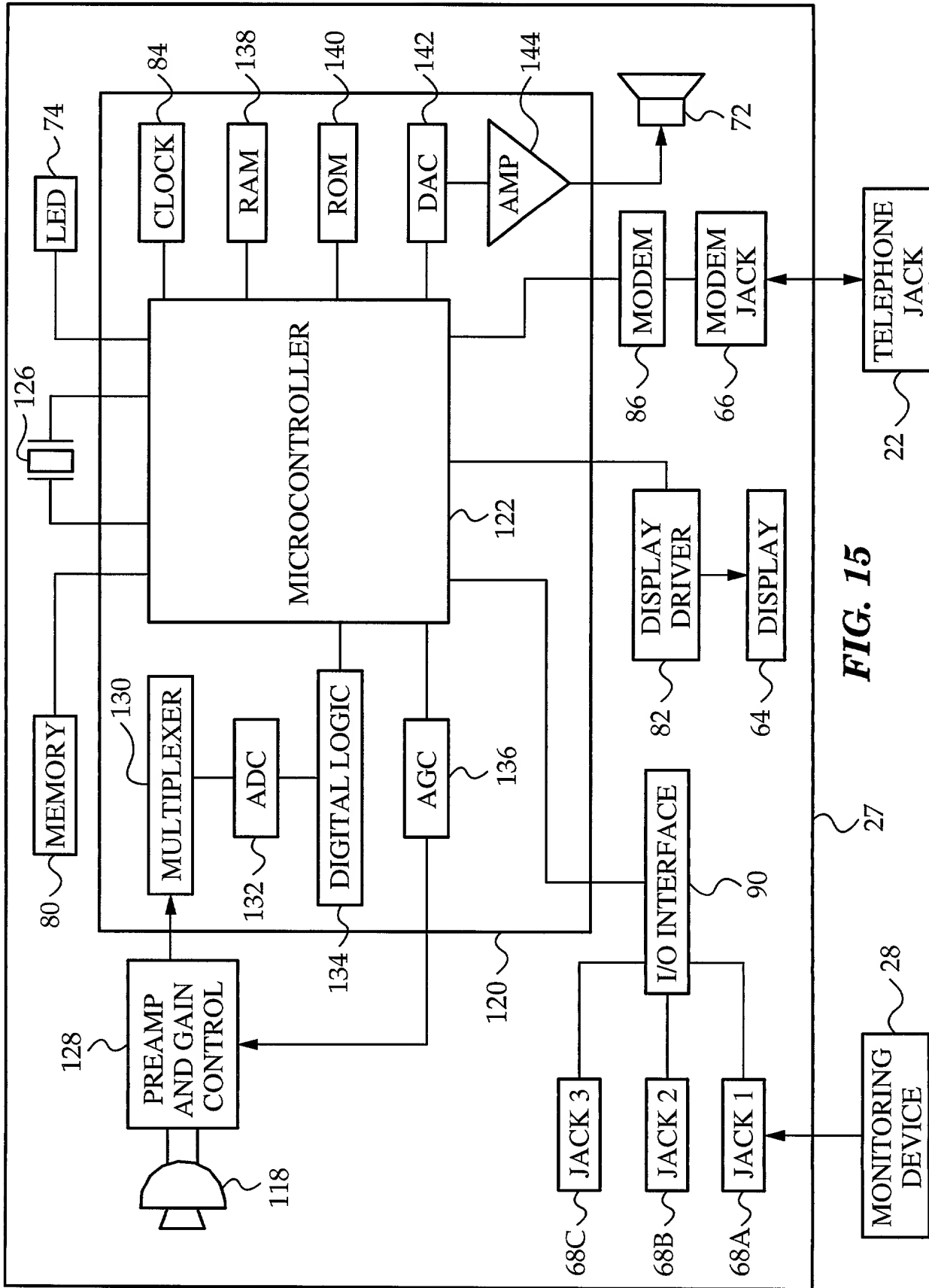


FIG. 14

663240" 95800E58



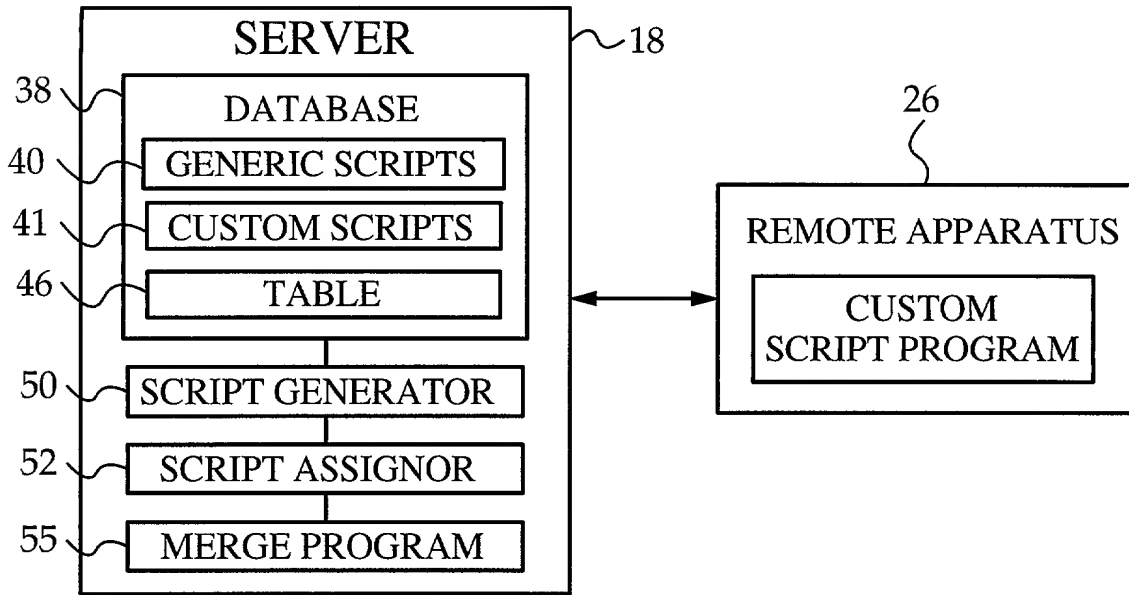


FIG. 16

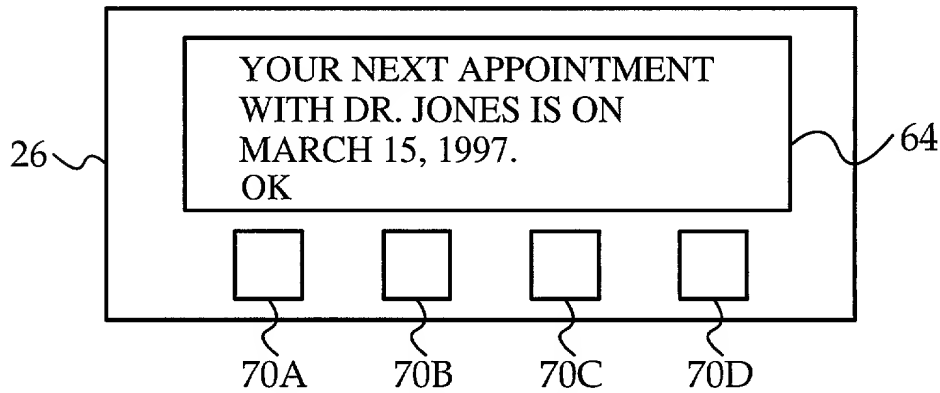


FIG. 17

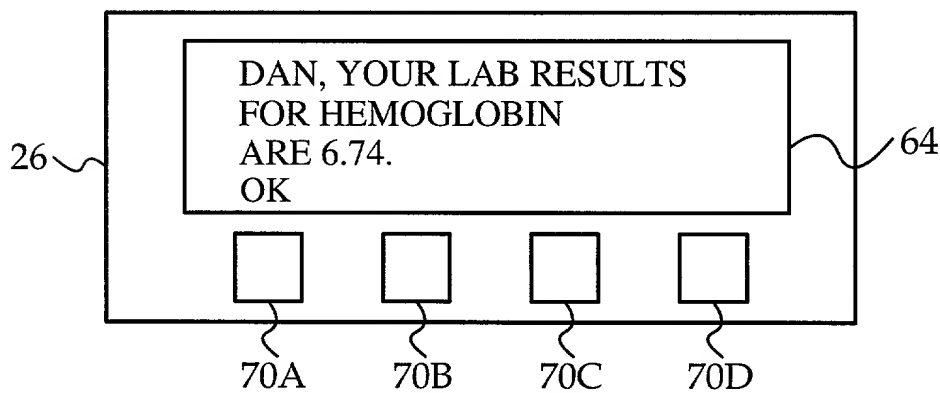


FIG. 18

56

SCRIPT ENTRY SCREEN

SCRIPT NAME:

92

STATEMENTS	CHOICE 1	CHOICE 2	CHOICE 3	CHOICE 4
YOUR NEXT APPOINTMENT WITH <<INSERT PHYSICIAN_NAME>> IS ON <<INSERT APPOINTMENT_DATE>>	OK			
<<INSERT PATIENT_NAME>>, YOUR LAB RESULTS FOR HEMOGLOBIN ARE <<INSERT HbA1c_RESULT>>	OK			
<<INSERT PATIENT_NAME>>, REMEMBER TO EXERCISE CONSISTENTLY	OK			

94

96

100

102

104

CONNECTION TIME:

CREATE SCRIPT

CANCEL

FIG. 19

Declaration for Patent Application and Power of Attorney

As a below named inventor, I hereby declare that my residence, post office address, and citizenship are as stated below next to my name, and that I believe I am the original, first and sole inventor (if only one is listed) or an original, first and joint inventor (if plural names are listed) of the subject matter which is claimed and for which a patent is sought on the invention described in the attached application entitled **NETWORKED SYSTEM FOR INTERACTIVE COMMUNICATION AND REMOTE MONITORING OF INDIVIDUALS.**

First or Sole Inventor:	Full name:	STEPHEN J. BROWN	Citizenship:	U.S.A.
	Residence:	3324 Woodside Rd., Woodside, CA 94062		
	Postal Address:	same as above		

I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above. I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a). I claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed.

PRIOR FOREIGN APPLICATION(S)

Country	Application Number	Date of Filing	Priority Claimed Under 35 U.S.C. §119
NONE			<input type="checkbox"/> Yes <input type="checkbox"/> No

I claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56 which occurred between the filing date of the prior application and the national or PCT international filing date of this application.

PRIOR U. S. APPLICATION(S)

Application No.	Filing Date	Status			
60/041,746	3/28/97	<input checked="" type="checkbox"/> Provisional	<input type="checkbox"/> Patented	<input type="checkbox"/> Pending	<input type="checkbox"/> Provisional
60/041,751	3/28/97	<input checked="" type="checkbox"/> Provisional	<input type="checkbox"/> Patented	<input type="checkbox"/> Pending	<input type="checkbox"/> Provisional
09/201,323	11/30/98	<input type="checkbox"/> Provisional	<input type="checkbox"/> Patented	<input checked="" type="checkbox"/> Pending	<input type="checkbox"/> Provisional
09/274,433	3/22/99	<input type="checkbox"/> Provisional	<input type="checkbox"/> Patented	<input checked="" type="checkbox"/> Pending	<input type="checkbox"/> Provisional
08/946,341	10/7/97	<input type="checkbox"/> Provisional	<input type="checkbox"/> Patented	<input checked="" type="checkbox"/> Pending	<input type="checkbox"/> Provisional
08/847,009	4/30/97	<input type="checkbox"/> Provisional	<input type="checkbox"/> Patented	<input checked="" type="checkbox"/> Pending	<input type="checkbox"/> Provisional


I hereby appoint Thomas J. McFarlane, Reg. No. 39,299, Marek Alboszta, Reg. No. 39,894, as my agents with full power of substitution to prosecute this application and transact all business in the United States Patent and Trademark Office connected therewith. Direct all correspondence to:

Marek Alboszta
426 Lowell Avenue
Palo Alto, CA 94301-3813
Telephone: 650-321-6630
Fax: 650-321-1621.

The attorney docket number for this case is: **RYA-129/DIV.**

I declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both under Title 18, §1001 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

INVENTOR SIGNATURE(S)


STEPHEN J. BROWN


Date

POWER OF ATTORNEY BY ASSIGNEE

The undersigned assignee of the entire interest in the attached application for Letters Patent for the invention entitled:

Networked System for Interactive Communication and Remote Monitoring of Individuals

by virtue of Assignment recorded concurrently herewith hereby appoints Thomas J. McFarlane, Reg. No. 39,299, Marek Alboszta, Reg. No. 39,894 as its agents to prosecute the attached application and to transact all business in the Patent and Trademark Office connected therewith, said appointment to be to the exclusion of the inventor(s) and their attorney(s) in accordance with the provisions of Rule 32 of the Patent Office Rules of Practice.

Please direct all communication relative to said application to the following correspondence address:

MAREK ALBOSZTA

Lumen
426 Lowell Avenue
Palo Alto, California 94301
Telephone: 650-321-6630
Facsimile: 650-321-1621

I am duly authorized to sign this instrument on behalf of assignee corporation. I hereby declare that, to the best of my knowledge and belief, title is in the assignee herein, and I affirm review of the Assignment document concurrently submitted and believe that the attached application has been assigned to assignee herein and that assignee therefore has the right to make this Power of Attorney and Exclusion of Inventor(s).

I declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

ASSIGNEE: **HEALTH HERO NETWORK, INC.**

Health Hero Network, Inc.
2570 West El Camino Real
Suite 111
Mountain View, CA 94040

Official Authorized to Act on Behalf of Assignee:

Signature: 

Name: Stephen J. Brown

Title: President

4/27/99
Date